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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/767,195

Applicant(s)

SUNDAR, SATISH

Examiner

Rakesh K. Dhingra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) 6,7,9 and 12-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,10,11 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 6/5/06 have been fully considered but they are not persuasive as explained hereunder.

1) Claims 1, 2 [35 USC 102 (a)]

Applicant argues that Arai does not teach claim limitation “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate”.

Examiner responds that as explained below, Arai teaches all limitations of claim 1 including “---at least three lift pins (elements) 13 movably coupled to a susceptor (substrate support) 12 in a spaced apart relation (total of three lift pins spaced apart from each other) proximate a perimeter of the susceptor (substrate support) 12, and a first end of each lift pin (element) 13 adapted to engage an edge of the substrate 20 (Figures 1, 2 and paragraphs 0021-0029)”.

Applicant also contends that “at least three elements” recited in claim 1 are not anticipated by “lift pins” of Arai and that “elements” of claim 1 and “lift pins” of claim 14 should be given different meaning.

Examiner responds that limitations of claim 14 (that is, pertaining to lift pins) have no relevance to the rejection of claim 1. Accordingly rejection of claims 1, 2 under 35 USC 102 (a) is maintained.

2) Claims 3, 4 [35 USC 103 (a)]

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Applicant argues that Hirose also does not teach the elements of claim 1 that is “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate” and therefore claims 3, 4 are patentable being dependent upon claim 1.

Examiner responds that as explained above Arai does teach all limitations of claim 1 and thus rejection of claims 3, 4 under 35 USC 103 (a) is maintained as explained below.

3) Claims 5 and 10-11 [35 USC 103 (a)]

Applicant contends that combining Meares with Arai and Hirose would not yield the claim 1 limitation “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate”, and this claims 5, 10-11 are patentable as being dependent upon claim 1.

Examiner responds that claim 1 limitation “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate” is taught by Arai as explained above. Reference by Meares is included in rejection regarding claim limitation “wherein each of at least three elements is adapted to rotate about an axis parallel to a plane of substrate support. Thus rejection of claims 5, 10-11 under 35 USC 103 (a) is maintained.

3) Claim 8 [35 USC 103 (a)]

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Applicant argues that Gibson also fails to teach claim 1 limitation “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate” and thus claim 8 is patentable as being dependent upon claim 1.

Examiner responds that as explained above, Arai teaches claim 1 limitation “---at least three elements movably coupled to a substrate support in a spaced apart relation proximate a perimeter of the substrate support, and a first end of each element adapted to engage an edge of the substrate”. Thus rejection of claim 8 under 35 USC 103 (a) is maintained.

New claims 23-25 are also rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2 are rejected under 35 U.S.C. 102(a) as being anticipated by Arai (US PG PUB No. 2003/0075109).

Regarding Claim 1: Arai teaches an apparatus (Figures 1, 2) comprising:

a reaction chamber (chamber body) 11 having a bottom;

a vertically moveable susceptor (substrate support) 12 disposed in the chamber body and having a first side adapted to support a wafer (substrate) 20 during processing,

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at least three lift pins (elements) 13 movably coupled to the substrate support in a spaced-apart relation proximate a perimeter of the substrate support;
a first end of each lift pin 13 extending beyond the first side 12c of the substrate support, the first end adapted to engage an edge of the substrate 20, and
a second end of each element positioned below a second side of the substrate support 12 and adapted to engage the bottom of the chamber body when the substrate is in a lowered position (Paragraphs 021, 0022).

Regarding Claim 2: Arai teaches the susceptor (substrate support) 12 further comprises at least three apertures 12b adapted to receive the three lift pins 13 there-through (Paragraph 0022).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, 23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (US PG PUB No. 2003/0075109) in view of Hirose et al (US Patent No. 6,104,002).

Regarding Claims 3, 4: Arai teaches all limitations of the claim except the three apertures disposed through the substrate support are sized to accommodate a pre-defined radial displacement of the at least three elements.

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Hirose et al teach an apparatus (Figures 3-5) that comprises a chamber 21 having a support plate (substrate support) 22 that has plurality of holes 28 for passage of support pins 30 and where the holes 28 are large enough to permit horizontal movement (includes radial) of pins 30. Hirose et al further teach that extent of horizontal (includes radial) movement can be set (pre-defined) as per other relevant considerations like length of support pin, and width of leg portion 30a. Hirose et al also teach that support pins 30 are movable in up/down direction through support plate (substrate support) 22, due to movement of holding member 31 that is attached to lift mechanism 33 (Column 5, line 20 to Column 6, line 5).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide for radial displacement of pins in the holes in substrate support as taught by Hirose et al in the apparatus of Arai to reduce particle generation as a result of contact between support pin and internal wall of the hole in the substrate support (Column 2, lines 1-35).

Regarding Claim 23: Hirose et al teach that first end of each support pin (element) 30 is laterally movable (Figures 3-5 and column 2, lines 25-35 and column 5, lines 20-65).

Regarding Claim 25: Arai teaches (Figure 1, 2) that maximum height (elevation) of first end of pins (elements) 13 with respect to first side of susceptor (substrate support) 12 is fixed (paragraphs 0021-0029).

Claims 5, 10, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (US PG PUB No. 2003/0075109) in view of Hirose et al (US Patent No. 6,104,002) as applied to Claim 4 and further in view of Meares et al (EP 0290218).

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Regarding Claim 5: Arai in view of Hirose et al teaches all limitations of the claim except that each of the at least three elements is adapted to rotate about an axis substantially parallel to a plane of the substrate support.

Meares et al teach an apparatus (Figure 8) that includes a platen (substrate support) P that supports wafer W with the help of plurality of fingers (elements) f1 – f4 and where the fingers f experience rotational motion about pivot arc Pa when the wafer is gripped by the fingers (Column 8, lines 10-30).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide for rotational movement of fingers (elements) as taught by Meares et al in the apparatus of Arai in view of Hirose et al to properly engage and disengage the wafer (Column 1, lines 45-50).

Regarding Claims 10,11: Meares et al teach that fingers f are biased (pivoted) about Pa by the resilient spring portion (biasing members) 41a that are also coupled around pivot Pa. Meares et al do not teach that the resilient spring portions (biasing members) are torsion springs, but teach that geometry of collet 41 (means including resilient spring portions) could be selected (could include torsion springs also) depending upon other related parameters (Column 7, lines 10-330).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (US PG PUB No. 2003/0075109) in view of Hirose et al (US Patent No. 6,104,002) as applied to Claim 4 and further in view of Gibson et al (US PG PUB No. 2003/0118741).

Regarding Claim 8: Arai in view of Hirose et al teaches all limitations of the claim except that second end of each of the elements comprises a roller.

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Gibson et al teach a substrate support apparatus where due to vertical space constraint, rollers are attached to ends of vertically oriented lift pins that move wedges horizontally as the pins move vertically (Paragraph 0027).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use rollers attached to second end of pins (elements) as taught by Gibson et al in the apparatus of Arai in view of Hirose et al to facilitate vertical movement of wafer in space constrained chuck assemblies (Paragraph 0027).

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (US PG PUB No. 2003/0075109) in view of Meares et al (EP 0290218).

Regarding Claim 24: Arai teaches all limitations of the claim except that first end of each element is configured to rotate relative to substrate support.

Meares et al teach an apparatus (Figure 8) that includes a platen (substrate support) P that supports wafer W with the help of plurality of fingers (elements) f1 – f4 and where the fingers f experience rotational motion about pivot arc Pa when the wafer is gripped by the fingers (Column 8, lines 10-30).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide for rotational movement of first end of elements as taught by Meares et al in the apparatus of Arai to properly engage and disengage the wafer (Column 1, lines 45-50).

Conclusion

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh Dhingra



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Art Unit 1763